

6. The system of claim 1, wherein the controlled system parameters further include one or more parameters selected from the group consisting of: power from the acoustic transmitter, beam pattern of the acoustic radiation, phase of the acoustic radiation, pulse duration of the acoustic radiation, and duty cycle of the acoustic radiation.

7. The system of claim 1, wherein the one or more system variables are selected from the group consisting of: load impedance, acoustic transmitter efficiency, acoustic transmitter impedance, acoustic transmitter beam pattern, distance between the acoustic transmitter and the receiver unit, transmission efficiency between the acoustic transmitter and the receiver unit, receiver unit efficiency, receiver unit impedance, receiver unit aperture, changes in parameters of the power recovery circuit, and changes in parameters of the adaptively reconfigurable electrical impedance matching network.

8. The system of claim 1, wherein the power recovery circuit is adaptively reconfigurable responsive to changes in the one or more system parameters.

9. The system of claim 1, wherein the electrical load provides one or more functions selected from the group consisting of: electrical stimulation, optical stimulation, acoustic stimulation, neural recording, temperature sensing, pressure sensing, drug sensing, impedance sensing, detecting biological species, heating, and data communication.

10. The system of claim 1, wherein the system controller includes one or more system sensors selected from the group consisting of: load power sensor, load voltage sensor, load current sensor, output electrical AC signal voltage sensor, transducer output impedance sensor, transducer output voltage sensor, transducer output current sensor, receiver unit temperature sensor, and acoustic transmitter temperature sensor.

11. The system of claim 1, wherein the electrical load is an energy storage device.

12. The system of claim 1, wherein the system controller is configured to provide location tracking of the receiver unit combined with beam forming of the acoustic radiation according to the tracked location of the receiver unit.

13. The system of claim 1, wherein the receiver unit further comprises one or more auxiliary acoustic transducers, wherein an output of the acoustic transducer and outputs of the one or more auxiliary acoustic transducers are combined and provided to the electrical load.

14. The system of claim 13, wherein the output of the acoustic transducer and the outputs of the one or more auxiliary acoustic transducers are combined coherently.

15. The system of claim 13, wherein the output of the acoustic transducer and the outputs of the one or more auxiliary acoustic transducers are combined incoherently.

16. The system of claim 13, wherein the controlled system parameters further include a combining configuration of the acoustic transducer and the one or more auxiliary acoustic transducers.

17. The system of claim 1, wherein the acoustic transmitter is configured to be wearable.

18. The system of claim 17, further comprising a mobile device in communication with the acoustic transmitter.

19. The system of claim 1, wherein the receiver unit further comprises at least a back-side structure having acoustic impedance of 10 Mrayl or less.

20. The system of claim 19, wherein the back-side structure has an acoustic impedance of 2 Mrayl or less.

21. The system of claim 1, wherein the system controller is configured to provide real-time control of the controlled system parameters.

22. The system of claim 1, wherein the system controller is configured to provide pre-determined changes to the controlled system parameters.

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